from different localities and examined for infection by larvae of *Microtrombidium*. During 1976, 12.70 to 14.10 per cent of (average being 13.4 per cent) were infected by the acarine. Similar trend was noticed during 1977 also and the infection ranged from 11.80 to 13.70 per cent, average being 13.00 per cent. The ectoparasite was found attached in general, on almost all parts of the host fly, namely wings, head, mouth parts, thorax, abdomen and legs, the maximum individuals occurring at wing articulation and on the mouth parts. These suck the body fluid of the host fly and severely infected flies fail to feed and fly, become weak and finally die.

The larva of *Microtrombidium* is about 0.43 mm long and 0.19 mm wide with the colour of the body being red. Two blackish dots are visible externally, one each on the thorax and the abdomen. On the thorax, blunt small spines are present. The body and appendages are densely clothed by fine spines. Laterally, on the dorsal surface of the body, polygonal areas are present.

Transmission of this ectoparasite takes place during the process of mating. Often the larvae are shed off in the debris from the host body from where they stick on to the body of visiting house flies.

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26. A SUPERNUMERARY LARVAL INSTAR AND ANTIMELANIN EFFECT ON THE 6TH INSTAR LARVAE OF *SPODOPTERA LITURA* (F.) (LEPIDOPTERA: NOCTUIDAE) BY ALTOZAR—A JUVENILE HORMONE ANALOGUE

A number of analogues of the juvenile hormone have been obtained and tested against several species of insects to inhibit the adult growth and reproduction. Altozar is one of these analogues. In the present note observations carried out with Altozar against *Spodoptera litura,* a serious lepidopterous pest of several crops for its juvenile effect are reported.

Newly moulted 6th instar larvae of *S. litura* were obtained from a stock culture maintained in breeding jars at 27± 1°C and 70-80% R.H. Separate strips of filter paper each measuring 3.0×3.0 cm were soaked in 0.25 ml acetone solution containing 0.25 mg, 0.50 mg and 1.00 mg Altozar (Ethyl 3, 7, 11-trimethyl-(2E, 4E)—2, 4-dodecadieonate), a juvenile hormone analogue (supplied by Zoecon Corp., Palo Alto, California, U.S.A.) and dried. On each paper strip, treated with the respective concentration, a group of three larvae of *S. litura,* newly moulted from the 5th instar were released to remain in contact with the treated paper for two days. A total of 78 larvae were treated with each concentration. Strips soaked in

acetone alone served as control. These larvae were daily provided with fresh castor leaves as their food.

All the larvae kept in contact with the treated strips with the respective concentration of Altozar developed red pigmentation on the cuticle instead of normal dark black pigmentation within 24 hrs. Further, the larvae contacting 0.50 mg and 1.00 mg concentrations of Altozar had longer (5-6 days) duration of this instar than that of the control which had 3-4 days duration of the 6th instar.

Out of the larvae in contact with 0.50 mg concentration, 5.0 per cent unsuccessfully tried to moult to a supernumerary larval instar. Such larvae developed a new cuticle below the larval cuticle of the 6th instar but the older cuticle could not be cast off completely inspite of the repeated trial by the larvae and they died after 3-4 days. In case of the larvae kept in contact with 1.00 mg concentration, 6.25 per cent larvae died in their unsuccessful attempt to moult to a supernumerary instar, but 13.33 per cent of these larvae successfully moulted to a supernumerary instar which also had red pigmentation.

The larvae when they successfully entered the supernumerary larval instar had an average duration of two days and their average length and width were 4.860 cm and 0.658 cm respectively as compared to 4.12 and 0.50 cm of the normal 6th instar larvae. The supernumerary larvae were also heavier (0.939 g) as compared to the normal 6th instar larvae (0.616 g average). In other morphological respects supernumerary larvae were like those of the 6th instar. However, all the supernumerary larvae died during the larval-pupal moult.

Melanin pigments are generally incorporated in the substance of the cuticle, they range in colour from yellow to black. Tyrosine (Monoxy-phenyl alanine) is oxidized in the presence of the enzyme Tyrosinase (Cordier 1928). At least three compounds are recognized in the tyrosinase complex: monophenolase converting tyrosine to 'dopa' or 3-4-dioxy- phenylalanine; diphenolase, a copper protein compound converting 'dopa' to red substance, hallachrome; and enzyme III, apparently a dehydrase which converts hallachrome to a colourless substance and then to melanin (Danneel 1946). In *S. litura,* it appears that Altozar inhibits enzyme III so that hallachrome did not convert into melanin and remained to give red coloration of the cuticle. However, in *Blatella germanica,* Altozar increased level of melanization in supernumerary nymphs and adultoids (Riddiford *et al.* 1975).

In *S. litura,* the duration of larval period increases probably because of the presence of exogeneously applied juvenile hormone analogue in the last larval stage which delayed the pupal moult. The implantation of active corpora allata results in the production of a supernumerary larva in *Galleria mellonella* (Sehnal 1968). Application of *Cecropia* Juvenile hormone to final instar larvae also have the same effect (Sehnal and Meyer 1968). Thus the formation of a supernumerary larval instar in *S. litura* totally conforms to the fact that the exogeneous application of juvenile hormone analogue to the last instar larva results in the production of a supernumerary larva. However, no significant increase in the number of larval stadia was observed in another lepidopteran, *Porthetria dispar* when its larvae were treated with Altozar (Granett 1974).

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27. *PTERIS DACTYLINA* HOOK. FROM SILENT VALLEY—A NEW RECORD FOR PENINSULAR INDIA

Beddome (1883, 1892) described twenty six taxa belonging to the genus *Pteris* Linn. (including *Campteria* Presl, p.p.), out of which fifteen are reported by him to be present in Peninsular India. Nair and S. R. Ghosh (1976) described a new species *Pteris furunculata* Nair et S. R. Ghosh from the Western Ghats. Further studies on the ferns of Kerala (Nair and S. R. Ghosh 1977 a, b) enabled them to discover *P. confusa* Walker, *P. gongalensis* Walker, *P. multiaurita* Agardh, *P. praetermissa* Walker and *P. roseo-lilacina* Hieron. from that area. *P. tremula* R. Br. was reported from Shevroy Hills, Salem Dt., Tamil Nadu, by Nair and S. R. Ghosh (1977 c). *P. heteromorpha* Fée and *P. memoralis* Willd. were discovered from Orissa by Nair and R. K. Ghosh (1975, 1978). Bole and D'Almeida (1977) described a new species *P. almeidiana* Bole et D'Almeida from Maharashtra. These new discoveries emphasize the need for more intensive and extensive explorations and herbarium studies with regard to the genus *Pteris* Linn. in Peninsular India particularly in view of the fast disappearing forests from the region and the consequent ecological imbalance setting in. It must also be stressed that several species of *Pteris* Linn. are very sensitive to environmental changes.

The present record of *P. dactylina* Hook. from the dam site in Silent Valley, Kerala is another addition to the fern flora of Peninsular India and it is certainly one among the threatened taxa of ferns from the area in view of the proposed Silent Valley Project. Earlier, this small and delicate plant was known only from Sikkim to Khasia. The present discovery, therefore, is also of phytogeographical signi-